

AEROSPACE Junior Badge

Try out six of these activities and find out how amazing the aerospace field is. From airplanes to kites to space shuttles - all part of the fun things you'll discover working on this badge.

ACTIVITY #1 - Read "The Best Dressed Astronaut" book.

Discuss space suits. As a group design a space suit that your troop would want to wear into space. Make a poster to hang in your meeting room.

ACTIVITY #2 - Build a Bubble-Powered Rocket!

Build your own rocket using paper and fizzing tablets (Alka Seltzer)!

Materials needed: paper, regular 8-1/2- by 11-inch paper, such as computer printer paper or even notebook paper. Plastic 35-mm film canister (see hints below), Cellophane tape, Scissors, Effervescing (fizzing) antacid tablet (Alka seltzer), Paper towels, Water, Eye protection (like eye glasses, sun glasses, or safety glasses)

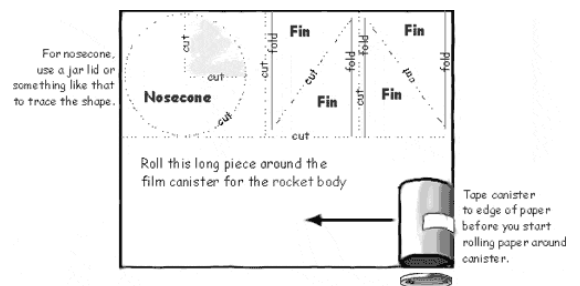
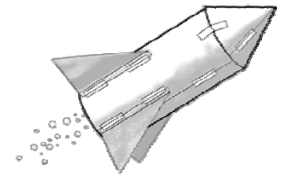
Hints: The film canister **MUST** be one with a cap that fits **INSIDE** the rim instead of over the outside of the rim. Keep in mind: Just like with real rockets, the less your rocket weighs and the less air resistance (drag) it has, the higher it will go.

Making the Rocket: You must first decide how to cut your paper. You may cut it the short way or the long way to make the body of the rocket. There is no one right way to make a paper rocket. Try a long, skinny rocket or a short, fat rocket. Try a sharp nosecone or a blunt nosecone. Try it with fins or without fins. Experiment! Here's just one idea for how you might cut your whole rocket from one piece of paper:

Here are the basic steps: Cut out all the pieces for your rocket. Wrap and tape a tube of paper around the film canister. Hint: Tape the canister to the end of the paper before you start wrapping. Important! Place the lid end of the canister down.

Tape fins to your rocket body, if you want. Roll the circle (with a wedge cut out) into a cone and tape it to the rocket's top. **Blasting Off:** Put on your eye protection. Turn the rocket upside down and remove the canister's lid. Fill the canister one-third full of water. Now work quickly on the next steps! Drop one-half of an effervescing antacid tablet into the canister. Snap the lid on tight.

Stand your rocket on a launch platform, such as your sidewalk or driveway. Stand back and wait. Your rocket will blast off!



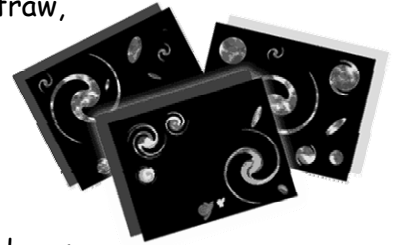
ACTIVITY #3A Make a GALEX Galaxy Montage

Make a colorful work of galactic art using coffee filters, markers, and construction paper. It will remind you of the beauty of the night sky and the great variety of shapes the galaxies take.

What you need: Coffee filters, any size, 2-6. (For best results, iron them flat before using.), One large sheet (11 x 17) of black construction paper, One large sheet (11 x 17) of colored or white construction paper (optional), Colored marker pens, at least 3 bright colors. These should be water-color pens, not permanent markers. You want the colors to run together! Water in a cup, Plastic sheet to protect table (a garbage bag works fine), Eye dropper or drinking straw, Scissors, Glue stick, Blue (or other color) glitter (optional)

What to do: Using the water-color markers, draw colorful designs on the filters. You could draw stars, planets, moons, and comets, if you like. After all, these are all objects that make up galaxies!

Spread out the plastic sheet to protect table or floor, and lay the coffee filters on it. Use the straw or eye dropper to dribble a few drops of water on the filters. The water will make the colors run together. Let the filters dry. When dry, cut them into galaxy shapes. You may want to make the "arms" of spiral galaxies very long. Scientists have discovered the spiral arms often extend much farther than anyone thought. If you make the galaxies different sizes, the smaller ones will seem to be farther away. Arrange your galaxies on the sheet of black construction paper and glue them down with the glue stick. If you like, use the glue stick to add some blue glitter highlights to your galaxies. The blue glitter can be the thousands of new stars being born in the galaxy. If you like, glue the extra piece of construction paper on the back to make a two-sided border.



ACTIVITY #3B Make a model of Saturn

What you need: One unwanted compact disc (CD), One 2-inch diameter styrofoam ball, carefully cut in half with a sharp knife, White glue, Wooden toothpicks, Paint brush, about 1/4 to 1/2 inch wide, Glitter--silver, gold, black or any other colors you want, Yarn, black or other colors (optional), Needle-nosed pliers (or scissors will do) Small paper clip, Thread

What to do: Decorate your Saturn and rings however you want. First, start with the rings: The CD will become Saturn's rings. The side with printing on it is the side you will decorate with glitter. Try not to get glitter in the center part of the CD, where you will be gluing the styrofoam ball. Use the paintbrush to carefully spread glue on the CD. If you want to make it look like some of the rings are silver and some gold, spread the glue only where you want to put the first color, then sprinkle the glitter on the wet glue. Let it dry completely. Then repeat for the remaining areas. You can use as many different colors as you want. Just be sure to let the glue dry completely for each color before adding the next color. If you want to use yarn

also--for example, black to show the divisions in the rings--glue it on and let it dry before adding the glitter.

Then decorate the planet: Stick a toothpick into the flat side of each half of the styrofoam ball to give yourself a handle. Use the paintbrush to apply glue and glitter on the round part of each half, as you did for the CD. Let the glue dry completely. Now put them together: Take the toothpick out of one of the styrofoam halves. On the other half, make sure the toothpick is stuck exactly into the center and push it in until it starts to poke out the top. Spread glue around the center of the decorated side of the CD. Pick up the CD and place the styrofoam half with the toothpick exactly in the center of the CD, toothpick sticking through the hole. Now push the other styrofoam half onto the toothpick sticking out the hole on the other side of the CD. When both halves are flat against the CD, a small part of the toothpick will be sticking out one of Saturn's poles." Break it off with needle-nosed pliers. Now hang it up:



Open a small paper clip so it looks like this: Decide which half of Saturn you want to be the top. Since Saturn's axis is tilted 27 degrees, stick the paperclip into the top about $\frac{1}{2}$ inch away from the center (where the toothpick comes through). Angle the paperclip so it passes through the hole in the CD and helps hold the two styrofoam halves together. When you hang your Saturn up, and it turns in the breeze, you will see the "rings" from different angles, just as we see the real Saturn at different angles from Earth.

ACTIVITY #4 Female Astronauts

Borrow from the library (or GSRI) a DVD about a female astronaut. Have a movie "meeting" and share these stories and some popcorn!

Sally Ride - *The Sally Ride Story: A Woman Space Pioneer*, This one hour documentary profiles the life and experiences of Dr. Sally Ride, the first American woman to fly in space aboard the Space Shuttle STS-7 in June 1983. The video takes a look at Dr. Ride's training for over six years before her first flight.

Explore her thoughts and feelings during the two missions she flew before retiring from NASA and her views on the future of women in the space program.

Christa McAuliffe - *Reach for the Stars* a documentary on the life of our nation's first Teacher in Space. Christa McAuliffe, the New Hampshire teacher aboard the ill-fated Space Shuttle Challenger on January 28, 1986. This film explains why Christa McAuliffe was willing to accept the risks and charts the legacy of her life and death.

Other women in space history - *The Mercury 13: The Untold Story of the Thirteen American Women and the Dream of Space Flight* by Martha Ackmann (2003), *Tethered Mercury: A Pilot's Memoir: The Right Stuff... But the Wrong Sex* by Beatrice Trimble Steadman with Jody M. Clark (2001), *Women Astronauts* by Laura S. Woodmansee (2002), and NASA, www.jsc.nasa.gov/bios/. For more information on Women In Flight - www.ninetynines.org

ACTIVITY #5 - Visit the Quonset Air Museum

The Quonset Air Museum (QAM) mission is to educate the public in Rhode Island aviation legacy through activities, hands-on displays and presentations. Creative, interesting displays at the museum provide visitors with a wealth of information addressing all topics of aviation. These educational, interactive displays, are throughout the museum, some related directly to the many aircraft on display. These provide visitors with a clear understanding of the history and science of aviation. The QAM has many current and former pilots in the membership eager and willing to teach aviation subjects such as theory of flight, navigation, weather and engine operation to interested students. Contact the Quonset Air Museum for information concerning field trips, presentations, guided tours by former military pilots and open cockpit days. The Quonset Air Museum is located at Quonset Point in North Kingstown, RI. Please contact us at education@TheQAM.org or call us at 401-294-9540. Our Fax number is 401-294-9887.

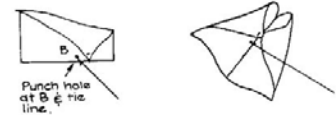
ACTIVITY #6 - Build a Kite and have a Kite Flying Day

Easiest Kite: The Bumblebee, A Simple paper fold kite

This small kite is ready in a couple of minutes after gathering a couple of materials: 1 sheet of standard copier paper, thread, stapler, hole punch, scotch tape, pencil.

Optional: Decorate the piece of paper with crayons, coloring markers or pencils

Directions: Fold the sheet of paper in half... Mark two points, A and B on the folded edge of the paper. Point "A" should be 2 1/2 inches from the end, and point "B", 2 1/2 inches. Fold the top corners of the page to point A and staple them in place. Do not crease the paper. Just bend it back. Punch a hole at point B and attach your flying thread.



A Fish Kite: Draw a fish shape on a paper plate (large as possible). Cut out the shape and then decorate it using crayons, tissue paper, sequins, etc. Glue two or three 12" long pieces of party streamers (various colors) to the tail of the fish (plate). Punch a hole at the nose (front) of the paper plate, and tie a piece of yarn through the hole. Tape and then wind the other end of the yarn to a craft stick. Go outside fly the kites on a windy day. The streamers are such fun waving in the wind when the girls take off running to loft their kites behind them, holding on tightly to the craft stick. These kites really fly!!!

Easy, Inexpensive Kite: You can make a fun and inexpensive kite using a cellophane shopping bag (the really thin ones work best). Decorate with stickers and tape 3-4 streamers at the bottom of the bag. Tie the handles together with a piece of yarn about 3-4 feet long, tie a loop at the other end to hold onto. Go outside and run with the kite holding onto the loop. They fly really well!

ACTIVITY #7 - Freeze Dried Foods

Freeze-dried foods have long been enjoyed by U.S. Astronauts on space exploration missions dating back to the Apollo Program. The most common dehydrated food recipes that are being used today are those of instant soups. These soups are very convenient to prepare and almost anyone can make them in no time at all. These factors are mainly responsible for their popularity.

Enjoy your own freeze dried foods: Use some of the recipes below or visit a camping store (REI, LL Bean, Bass & Pro Shop, etc) and share your snacks either at a meeting or on a hike.

Hot Raspberry Tea Mix in a Mug

1 T sugar, 2 tsp Country Time Lemonade powder, 1/2 tsp unsweetened instant tea, 1/2 tsp raspberry gelatin. Measure into small Ziploc baggie, seal & shake to combine. Add hot water to a mug with above mixture.

Potato Soup in a Mug

1-3/4 cups instant mashed potatoes, 1-1/2 cups dry milk, 2 Tb. instant chicken bullion, 2 tsp. dried minced onion, 1 tsp. dried parsley, 1-1/2 tsp. seasoning salt. Combine all & then divide by measuring 1/2 c. into each small ziploc bag. Empty mix into mug and fill with boiling water, whisk, allow to set 3 minutes.

Enjoy with lots of dried fruit for dessert!

ACTIVITY #8 Egg Drop

Shock absorption is an important part of aeronautical aviation. Protection from vibration, acceleration, and deceleration is necessary in the design of all spacecraft. Here is an experiment for you to design an efficient container that can stand up to shock absorption.

Materials: Raw egg (and a few extra), one container no larger than 6" x 6", assorted packing materials, String or tape

Directions: The object of this activity is to wrap up an egg so that it won't break when dropped from a height. The recommended height is 12-15 feet. Design a container which will protect the egg from breaking. It should be lightweight and sturdy. Most of all, it should withstand sudden impact with the ground. Good luck.

